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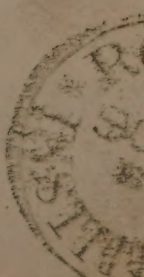
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AND

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the medical and surgical profession. Should these efforts be honoured by your approbation, it cannot fail to excite in the author the deepest sense of gratitude, and be for ever regarded as the highest reward his labours could receive.

With all respect,

I have the honour to be

Your devoted

And obliged servant,

JOHN MARSHALL.

*53, Jermyn Street,
December, 1829.*

INTRODUCTION.

THE object of this treatise is to bring into a narrow compass the principal causes of vaccine failure, in the hope of removing those doubts which have been too frequently thrown upon the practice. The facts are supported by observation made during an extensive practice, under the direction and patronage of the National Vaccine Board, established by Parliament, and munificently supported by its annual grants.

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An arrangement has been adopted of classing the more prominent objects of interest under distinct heads, so that by reference to the table of contents the reader may at once become acquainted with all that is said upon any one point in the inquiry.

TABLE OF CONTENTS.

	Page
DEDICATION.	
INTRODUCTION.	
SECT. I.—Whether the Vaccine Disease was derived from the Grease of the Horse	1
SECT. II.—Origin of Vaccination, with the regular and spurious Disease in the Cow and Milkers	5
SECT. III.—The Disease which was lately discovered by the author in the Cows of Hyde Park	12
SECT. IV.—Mr. Benjamin Jesty vaccinated full thirty Years before Dr. Jenner	14
SECT. V.—Origin of the Vaccine Matter now in Use	16
SECT. VI.—Vaccine Lymph not deteriorated by numerous Transmissions through the human Constitution	18
SECT. VII.—Neither consequential Disease, nor Death, is ever attributable to Vaccina, nor are constitutional Affec- tions aggravated by it	19
SECT. VIII.—The Question as to the Permanence of Vaccine Security considered	23
SECT. IX.—Repetition of Vaccination unobjectionable, since it cannot communicate any other than its own Disease	27
SECT. X.—The Abuse of Vaccination	29
SECT. XI.—The important Period of using the Vaccine Lymph	30
SECT. XII.—Several Vesicles more advantageous than one or two	36
SECT. XIII.—An Appeal to Parents	41
SECT. XIV.—Physiological View of the Mahogany-coloured Crust	42
SECT. XV.—Inflammation after the Height of the Vesicle	44

	Page
SECT. XVI.—Description of the regular Vaccine Vesicle .	45
SECT. XVII.—Cases of Secondary Small-Pox more severe than those after Vaccination	47
SECT. XVIII.—The Age at which Vaccination should be performed, and the requisite domestic Management .	48
SECT. XIX.—Medical and surgical Treatment, with Re- marks on Climate and Seasons	50
SECT. XX.—Practical Occurrences and Casualties having Relation to the Operation of Vaccination, including the Manner of inserting the Lymph	53
SECT. XXI.—A most remarkable, and probably unique, Case of Vaccination, accompanied by the Phenomenon of true Vaccine Eruption	61
SECT. XXII.—Proportion of Cases discovered to have been unprotected, on the Repetition of the Process of Vaccina- tion	64
SECT. XXIII.—Anomalous Cases, wherein the Constitution resisted frequent Vaccination, and also two synonymously of Small-Pox Inoculation	66
SECT. XXIV.—The Occurrence of Small-Pox after three Vaccinations	70
SECT. XXV.—A Case of Small-Pox eleven Years subse- quent to Vaccination	72
SECT. XXVI.—Protracted Cases, exceeding the twelfth Day	73
SECT. XXVII.—Premature Cases under Vaccination .	78
SECT. XXVIII.—Chicken-Pox mistaken for Small-Pox after Vaccination	80
SECT. XXIX.—Practical Remarks on the Cicatrix or Vac- cine Scar	82
SECT. XXX.—Extinction of Small-Pox in foreign Coun- tries, compared with its State in Great Britain	87
SECT. XXXI.—Conclusion	91

POPULAR SUMMARY

OF

VACCINATION.

SECTION I.

*Whether the Vaccine Disease was derived from
the Grease of the Horse.*

As a matter of curiosity it may perhaps be stated, that this disease has been supposed to have been derived from the grease of the horse; an affection peculiar to the heel and leg, or more commonly to the fetlock-joint of that animal: and it was believed by many, that persons who had been affected with the matter of grease were frequently proof against the contagion of small-pox. This equine disease, however, has nearly been extinguished by the improvements introduced into veterinary practice. By the scientific lights of comparative anatomy, physiology, chemistry, and medicine, the practical treatment of the

diseases of the horse is somewhat analogous to that of the human species ; and cleanliness, necessarily one of the first principles in surgery, is now more strictly enforced. If this disease be the foundation of the vesicle in the cow, the action of such co-operating causes must have materially checked the communication of the disease of the horse to the nipples of the cow, and may possibly account for the late rarity of the disease in the latter animal.

The disease, however, of the cow is probably *sui generis*, and is propagated alone in that animal, more commonly showing itself in the spring, and not unfrequently breaking out in the herd, when the grease of the horse is unknown in the neighbourhood.

The following highly interesting experiments, communicated to me by Mr. Sewell, assistant professor at the Royal Veterinary College, go far to negative the theory of such an origin: any prejudice, therefore, arising from that opinion may be very fairly given up. Mr. Sewell informs me that he was a witness to a series of experiments twice repeated at the Royal Veterinary College, in the presence of Dr. Jenner, Dr. Woodville,

Mr. Wachsell, and Mr. Turner, with a view to produce the vaccine disease in the teats of a cow. The matter of grease had been immediately taken from the horse, and variously applied to the nipples by long continued friction, punctures, scarifications, and by scratching the surface with a needle ; and from these severe trials neither inflammation nor any affection resembling a pock resulted. Many other unsuccessful inquiries have been made to identify the origin of vaccine disease with the grease. Sir Isaac Penington observes, in his letter to Dr. Pearson—"I cannot find, from those concerned in inoculation, that shoeing-smiths are less liable to the infection of the small-pox than other people." And the learned Dr. Parr says, "that the assertion, that the *variola vaccinae* proceeds from the heels of horses is gratuitous." He also censures the conclusions of Dr. Jenner on this part of the subject in somewhat severe terms : "Men servants seldom milk cows in this county ; and when they do, such insufferable dirtiness as to milk with hands steaming with the running of a sore heel would not be tolerated in any milking court in this county (Devonshire). Indeed I

think this publication is a libel on his own neighbourhood."

In Ireland it is notorious that men are never employed as milkers; the business is confined to women alone, who rather pertinaciously and jealously adhere to this established custom of their ancestors. Dr. Barry of Cork mentions thirteen instances of milkmaids who had taken the disease from the cow, which he discovered in his researches, confined to a small portion of the western part of the country, and who were afterwards exempt from small-pox.

Although the idea of such a source of the disease in the cow may be very fairly dismissed, yet it must be admitted as probable, that the grease is capable of producing, by inoculation on the human subject, all the phenomena of the *vaccina*; and it has also been affirmed, that the constitution remains afterwards unsusceptible of the variolous contagion. The experiment however has been tried in a number of cases, and they were found unprotected.

The grease, therefore, presents a very singular coincidence in the annals of physiology,

and must be regarded more as a subject of curiosity than practical utility, and becomes interesting only as a matter of philosophic research.

It may be here remarked as a singular fact, that the vaccine poison and the hydrophobic poison are the only specific morbid matters to the human animal economy which are clearly proved to be derived from brute animals.

We are altogether ignorant of the sources of small-pox contagion. In ancient authors it is described as originating from a disease in the hoof of the camel; but such an opinion is perhaps no less questionable than that connecting the vaccine disease with the heels of the horse, and requires a confirmation from modern inquiry.

SECTION II.

Origin of Vaccination, with the regular and spurious Disease in the Cow and Milkers.

THE disease among cows is of rare occurrence, but when it breaks out, unless the

grazier is on his guard, it will rapidly extend itself throughout the herd, being conveyed from one cow to the other by the milkmaid handling the teats; this affection being incident only to that part of the animal. It is sometimes discovered in the early stage by the kicking or restiveness of the animal when the nipples are attempted to be drawn. To check its progress, and to guard against its unpleasant consequences, the diseased subject is usually separated without delay from her companions, and one person is appointed to milk her. The milkers, thus receiving the infection most commonly about the joints of the fingers and at their extremities, also on their hands and wrists, gave rise, as we have already stated, to the idea of vaccination. In all the dairy counties, such persons were selected to attend, as nurses, those patients who were ill and dying of small-pox, it having been traditionally known that they were invulnerable to variolation.

Farmer Jesty, who was in his seventieth year (who will be more fully described in a subsequent section), on being interrogated how often the disease prevailed among cows, replied, "That it was by no means a common

or frequent occurrence : he had only seen the complaint three times during his life, and that it happened about once in two or three and twenty years, or thereaway." Dr. Pearson also confirms the rarity of the disease in cows by testimonies of gentlemen residing in dairy counties. The accuracy of such information has since been fully and variously confirmed by the long absence of the disease among the herds of all the dairy counties in England. During the year 1828, the board of the National Vaccine Establishment made numerous inquiries, through their extensive correspondence with practitioners in all the dairy counties, and no tidings could be learned of the disease in the cow ; whence it may fairly be considered as having been lost during a certain interval ; and were it not for the generosity and humanity of government, supported by the laudable and active zeal of the gentlemen who form the board, the nation might have been altogether deprived of the advantage arising from this happy discovery. The vast and rapidly increasing demand upon the establishment for lymph from all parts of the united empire affords additional proof of the scarcity of the original disease, and likewise

exemplifies that vaccina is rapidly advancing in public estimation, and thus displaying the triumph of reason over the scruples of prejudice. It was a very providential circumstance that a supply was forthwith attainable at a time when the scientific practitioners of this vast metropolis, so much to their honour, were eager in examining the practical value of vaccine inoculation.

The disease is not confined to the herds of this country, but has long been known on the continent, in Asia Minor, and in many other remote parts of the world.

The cow is but once susceptible of the disease, which affords an illustration of its durable property in the animal.

The disease in the cow cannot be more accurately described than in the words of Dr. Jenner, who bore witness to its occurrence in Gloucestershire among the herds of that dairy county ; who also, at the same time, defines an anomalous affection, and cautions the public against the consequences of its deception :

“ The vaccina appears in the nipples of the cows in the form of irregular pustules. At their first appearance they are commonly of a palish blue, or rather of a colour somewhat

approaching to livid, and are surrounded by inflammation. These pustules frequently degenerate into phagedenic ulcers which prove extremely troublesome. The animals become indisposed, and the secretion of milk is much lessened." Also a spurious vaccine disease sometimes attacks the animal, which is liable to lead to erroneous conclusions in practice. This subject was anticipated by the promulgator, who observes, that "pustulous sores frequently appear spontaneously on the nipples of the cows; and instances have occurred, though very rarely, of the hands of the servants employed in milking being affected with sores, and even of their feeling an indisposition in consequence. These pustules are of a much milder nature than those which arise from that contagion which constitutes the true vaccina. They are always free from the livid or bluish tint so conspicuous in the pustules of that disease. No erysipelas attends them, nor do they show any phagedenic disposition as in the other case, but quickly terminate in a scab, without creating any apparent disorder in the cow. This complaint appears at various seasons of the year, but most commonly in the spring, when the cows are fed with

grass. It is very apt to appear also when they are suckling their young."

This disease is incapable of producing any specific effects upon the constitution, and is therefore delusive. If genuine matter be kept too long, and suffered to undergo decomposition, it becomes inefficacious. Unless, therefore, the regular phenomena are gradually developed in the progress of the vesicle, it must be deemed impotent or spurious. All the changes of the regular vaccine vesicle in the human subject will be fully described in a future section. The spurious *variola vaccinae*, when imbibed by the milkers, is attended with eruptions, sometimes producing pits; whereas those of the genuine disease are local, or confined to the puncture producing the vesicle. Persons who have taken the false disease have been found by experiment unprotected, while others, becoming regardless thereby of infection, have been subsequently seized with variola.

The irregular figure of the true pustules on the teat of the cow may probably be ascribed to the indispensably mechanical operation of milking; for it is fair to presume, that if the vesicles could with safety to the animal be

left untouched, they would naturally assume the circular and more regular form. For when the disease is taken by the milker, and whatever parts are affected, they invariably preserve a circular shape, with an edge more elevated than the centre, and of a colour approaching to blue. The disease in the milkmaid is also accompanied by general symptoms of pyrexia, varying in the degree of violence, and generally continuing from one to two or three days, leaving ulcerated sores slowly healing, and frequently becoming phagedenic; thus strictly resembling the origin from whence they were derived.

The vaccina has been discovered among the herds in no less than fourteen counties in England. In one of the annual reports made by the faculty in France to the government, it curiously states, that the matter employed was obtained from Gloucestershire, being the only part of England wherein the disease had been found.

The vaccine disease is incapable of being communicated in a state of effluvia; nor scarcely by adhering to the skin, unless divided by abrasions, punctures, or wounds.

SECTION III.

*The Disease which was lately discovered by the
Author in the Cows of Hyde Park.*

THE disease in the cow was discovered early in September last, among a herd, comprising eighteen, grazing in Hyde Park. Only four in succession were infected. The animal at that time disordered was fully examined. When the teats were attempted to be drawn, the pain of the operation caused the cow to kick and be restive: to guard against accident, she was previously secured by ropes. Four of the largest nipples were swollen, and warm to the touch: during the milking blood issued freely, tinging the milk, and besmearing the hands of the milker. The nipples were black, by partaking of the predominant colour of the cow, which precluded the possibility of discovering the surrounding inflammation of the pustules, which, according to Dr. Jenner, is the infallible sign of genuine vaccina, and in all spurious affections invariably absent. The infected teats were studded with oval-formed pustules of a bluish colour, but probably arising from their general tint of

black, containing a semi-transparent fluid, varying in number from four to seven on each, about an inch asunder. The intelligence was communicated to Dr. Paris, at that time a member of the National Vaccine Board; and a gentleman of that establishment accordingly accompanied me soon afterwards, in order to obtain the recent matter, which we tried experimentally, but it completely failed. Another cow, perfectly white, had previously undergone the disease; the nipples were flesh-coloured, and three of the largest were sprinkled with four or five black scabs, inclining to an oval, and jagged at the edges; some were seated on the base of the teat, extending to the udder. A fourth we were in hopes was sickening: a reward was offered to give information should the disease be found to extend; but more than two months have elapsed without tidings. Out of four milkers employed no selection was made from amongst them during the milkings; their bloody hands were indiscriminately employed from one cow to the other in progressive rotation. When we consider the period that has elapsed, and the entire cessation of the disease, we may safely conjecture that its type was

spurious. The genuine vaccina being highly virulent is readily extended ; and, under such careless management, it is fair to suppose that it must inevitably have run through the herd, and also infected the milkers ; and it appears that the genuine disease is mostly followed by a troublesome phagedenic ulceration in the teats of the animal.

SECTION IV.

Mr. Benjamin Jesty vaccinated full thirty Years before Dr. Jenner.

A FARMER, bearing the name of Benjamin Jesty, residing in Downshay, isle of Purbeck, reasoning upon the facts described in a foregoing section, determined to try the effects of vaccine inoculation on himself, his wife, and two sons. He accordingly armed a needle from the vesicle on the teat of the cow, and operated on the back of the hand. This experiment took place in 1774, at least thirty years before Dr. Jenner became the great promulgator of vaccination. In the year 1804, Mr. B. Jesty and one of his sons came to London, at the request of the medical board

of the original Vaccine-Pock Institution ; and an excellent portrait was taken of the former by Mr. W. Sharpe, as well as an engraving, by Mr. W. Say, which is still in the possession of many of its former governors. On being asked why he did not persevere in his plan of inoculation, he replied,—“ That he was so laughed at and ridiculed by the inhabitants of the village, for introducing a *bestial* disease into his family, that he gave it up, and thought no more about it ; notwithstanding which, however, he had the highest confidence in its value as a substitute for small-pox, and rejoiced to find that it was taken up by the faculty.” Subsequently to this vaccination neither he nor his family took the small-pox. In order, however, to ascertain whether they were secure after the lapse of thirty years, Jesty and his son, at the desire of the board, were re-vaccinated, three punctures having been inflicted in each arm ; a practice invariably followed in this institution. (But more of this hereafter.) The operation was followed by premature irregular vesicles, attended by itching, which died off in a few days, satisfactorily demonstrating, that even the original inoculation by the needle

had not lost its protective influence upon the constitution. The description given by Mr. Jesty of the progress of the vesicle in each case was truly characteristic, and the rigorous trials he and his son had undergone clearly proved that they were not susceptible of small-pox contagion.

SECTION V.

Origin of the Vaccine Matter now in Use.

It is a curious fact, that the vaccine lymph originally and still employed in this metropolis, and diffused to all parts of the united empire and foreign climes, was taken from the cow in the year 1799, by the late Dr. George Pearson, founder of the Original Vaccine-Pock Institution, which, in the infancy of vaccination, rapidly afforded means of disseminating it to the poorer classes of society, and thereby of gratifying the anxious importunities of the faculty. The navy and army were also supplied by an order from government. At this early period the benefits of the institution were not confined to our own

country; from the same source its advantages were extended to France, Germany, Russia, Portugal, Italy, different parts of Asia, Africa, America, and the West Indies. To corroborate the principle laid down, as regards the original source of the lymph, I may here be permitted to make an extract from the First Report of the Vaccine-Pock Inoculation, written by the physicians to the institution, and published in 1803. “In 1798, after Jenner’s publication, no one was in possession of vaccine matter, during the remainder of the year 1798, except Mr. Cline, who inoculated one patient; but he did not avail himself of the opportunity of re-collecting it. Inquiries being made, among the farmers and others, concerning the history of the vaccine disease, matter was in consequence obtained in January, 1799, on the appearance of disease amongst the cows of Mr. Harrison, in Gray’s Inn Lane, and those of Mr. Willan, in Marylebone Fields. From these sources only the vaccine inoculation was begun and carried on in London, and in several provincial towns, with great zeal, by many practitioners; so that, by the termination of the year 1799, four thousand

persons at least had been vaccinated in London and its neighbourhood.

SECTION VI.

Vaccine Lymph not deteriorated by numerous Transmissions through the human Constitution.

THIS fact is at once proved by the character of the vesicle being in every respect the same, after the lapse of thirty years, as that presented in the first instance, when immediately produced from the cow. Having been, from the year 1800, a governor of the original Vaccine Institution, and joint treasurer for some years, it has enabled me to add my testimony to the truth of this curious fact, and which is exemplified by the coloured engraving prefixed to the First Report of the Vaccine Institution, published in the year 1803, exhibiting progressive specimens of the vesicle in all its important stages, and which exactly accords with the graphical representations of Dr. Jenner. My appointment of district vaccinator to the National Vaccine Establishment has afforded the additional

opportunity of minutely observing the repetition, in every essential point, in nearly three thousand cases. In the last Annual Report, dated March 2d, 1829, these remarks are most satisfactorily confirmed; “for it does not appear to us to be weakened or deteriorated by transmission through any number of subjects in the course of any number of years.” Hence the virus of the vaccine vesicle has the same properties, as appears from the effects on the human constitution, whether it be generated by the cow or by man; and these properties are the same, however remote from the origin of the poison in the cow; and it may be continued, *ad infinitum*, from one person to another, without any necessity of recurring to the original matter of the cow.

SECTION VII.

Neither consequential Disease nor Death is ever attributable to Vaccina, nor are constitutional Affections aggravated by it.

No consequential disease can be attributable to vaccination, nor has any been excited

to which there previously existed a disposition; nor has it been discovered to produce a predisposition to any particular affections. The accuracy of Dr. Jenner's prediction, also, on this momentous fact, has been every way confirmed by the most ample evidence arising from the test of long experience, which enables us to place implicit confidence in the harmlessness of the disease.

The cow, while affected, suffers severely, and so do the milkers during the progress of the disease, as already stated; yet neither the animal nor the milker, while under its influence, has ever been known to die; and although the casual vaccina is exempt from danger, it is rendered still milder by inoculation. During vaccination, therefore, all apprehension of danger, or future consequences of constitutional affections, are groundless. Mr. Henry Jenner, the nephew of Dr. Jenner, in his address to the public, "On the Advantages of Vaccine Inoculation," affirms with great truth, "that the small-pox calls latent diseases into action, and especially scrofula; whereas the vaccine disease, which proceeds from the healthiest and most cleanly of all animals, has no disposition to excite any other

complaint.” Some rare instances, perhaps, may have occurred of infants dying during or shortly after its progress, by accidental or sudden visitation of some acute disease, but wholly unconnected with the vaccine operation and its lenient constitutional affection. The only case I have ever heard of is in the annual bills of mortality, where one and sometimes two deaths are returned as falling under vaccination. The accuracy, however, of such statements is very questionable: upon a thorough investigation they would, in all probability, have been proved to have arisen from a different reason, and the report to have originated from the dreams of an old woman or a nurse, prejudiced against vaccination, from the fear of losing the more profitable attendance upon small-pox. The force of ignorance may have led to such a report even many months subsequent to vaccination. The constitution is generally improved by it, and the few in a contrary state, among children, have had no reason to impute it to the vaccine; yet where eruptions or skin complaints had come on, parents generally ascribed them to the vaccine disease. In many sickly chil-

dren, however, the beneficial effect has been noticed by various authors.

When the natural small-pox occurs to women who are *enceinte*, its fatal consequences to mother and child are well known. In all such instances, the benign superiority of vaccination is beautifully exemplified; the contrast is highly consolatory to the perceptions of humanity. Several mothers so situated have been vaccinated with perfect security, without the slightest deviation of symptoms in ordinary cases.

In many chronical and acute diseases, a person will apparently go through the disease as distinctly and slightly as one in perfect health, without aggravating the previous affliction, whether it be scrofula, glandular complaints, rickets, consumption, teething, chronic cough, or rheumatism. Instances have occurred, where the vesicles have been temporarily retarded for many days by the intervention of other diseases; but we have no evidence that any disorder thus intervening can permanently suspend the vaccina, after the infection has once taken effect.

In cases under the irritation of teething,

Dr. Pearson says, "It is very satisfactory to know, that of at least nine hundred children, while cutting teeth at all periods, not one was in danger from the vaccina on that account." It may, however, be observed, that under such circumstances it is difficult in public practice to refuse vaccination; because, on inquiry, the subject is sometimes exposed to the risk of variolous contagion; but, in private, should the child be exempt from all such apprehension, the period of teething had better be avoided.

SECTION VIII.

The Question as to the Permanence of Vaccine Security considered.

SOME practitioners entertain an opinion, which has greatly contributed to disturb public confidence, that the security from small-pox, derived from vaccination, is only temporary, and that it loses its conservative power after four or seven years. From what false pathological reasoning so prejudicial an idea has arisen it is not easy to conjecture; noso-

logy does not sanction any such argument ; there is no analogous fact in favour of such an hypothesis. The vaccine disease is surely worthy of being classed with those which are generally found to afflict the constitution but once during life ; such as small-pox, measles, and hooping-cough. In what manner the human frame is ever afterwards rendered insusceptible of their recurrence is truly surprising, and must ever remain a problem too difficult for the comprehension of man. Had our species been exposed to the unceasing repetition of such contagious diseases, population might have been swept from the surface of the globe : the child could scarcely have attained the period of manhood, the mighty object of the creation would have been lost, and the earth restricted to its primeval inhabitants—the beasts, birds, and fishes.

In my public and private practice upwards of a hundred and fifty patients have been re-vaccinated, in almost every instance producing premature irregular vesicles, accompanied by incessant itching, and dying off in a few days. These have been also tested at almost every age subsequent to the original vaccination. They have, however, chiefly consisted of the

mothers of poor children, who, whenever they have expressed a doubt of their security, have been re-vaccinated from their own babes; thus proving to demonstration (as they were in all probability vaccinated during their infancy), that the prior operation had not failed to extend its protecting influence throughout their lives.

Since the publication of my former observations in the *New Monthly and London Magazine*, I have been called upon to re-vaccinate several families: out of these cases one adverse exception occurred, which will be noticed hereafter. These cases consisted of young ladies and gentlemen, from childhood to years of maturity, and they have been found very generally secure; and, from the results, they were pronounced to be invincibly protected from all future apprehension of small-pox. It may be also here remarked, that the milkmaids, after imbibing the disease from the cow, were invariably considered free from contagion: we have never heard of one of them, thus circumstanced, catching the variola naturally, or by inoculation. The severe exposure they also underwent as nurses in the most dreadful cases of

small-pox clearly demonstrates and forcibly exemplifies its lasting hold upon the constitution. The disease, by never returning to the animal from whence it springs, also affords another proof. Even an illiterate yeoman, more than half a century ago, was forcibly struck with a parity of reasoning, and possessed the courage to venture upon the experiment on himself and his family, two of whom were re-vaccinated after the lapse of more than thirty years, and found protected. The generality of instances which, from time to time, are heard of to contravene these truths, upon inquiry, are found to have originated either from some other eruption which was mistaken for the small-pox, or that the vaccine disease had not in reality been previously excited.

These practical data, it is confidently hoped, will serve to refute and set at rest the absurd doctrine of temporary protection.

Among my own public and private patients vaccinated, no instance of small-pox has yet occurred ; the few adverse cases were formerly done by others. No blame or reflection, however, is here intended ; many cases vaccinated by experienced practitioners are well known, from undoubted authority, to have failed.

SECTION IX.

Repetition of Vaccination unobjectionable, since it cannot communicate any other than its own Disease.

CASES of small-pox after vaccination have recently occurred in some families of rank, which have caused a considerable panic, and a corresponding loss of confidence. Now, although the theory of insecurity has been strongly opposed in this work, yet no possible harm can arise by even an annual repetition of vaccination ; since, by such means, the apprehensions of the timid may be allayed, and persons possessing any peculiarity of temperament, which might render them liable to secondary small-pox, will thus continue in safety.

An erroneous impression, or a vulgar error, has frequently been detected in the mind of even the enlightened, viz. that the vaccine virus scatters the seeds of other diseases derived from the constitution of the person from whom it was obtained : such an opinion, however, is without cause, and opposed by the most ample experience. The small-pox no-

toriously gives rise to scrofula and other maladies; but the *vaccina* is unanimously absolved from such an imputation by the general voice of the faculty. Since its introduction, cases of scrofula or evil are materially diminished in their frequency. Scrofulous affections, so common in small-pox, have never been known to follow the vaccine disease.

It may also be taken for granted, that the child, at the breast of the poor, under vaccination, notwithstanding the intemperate living of some mothers, and the wretched fare of others, thereby producing very different qualities of milk; yet neither these differences of food and drink, nor dissimilar modes of life, have ever injured, in any respect, the property of the vaccine lymph.

Hence the remarkable ascendancy of vaccination over variolous inoculation: the former displays, comparatively, its homogeneous fixity and safety in all the varieties of temperament, and is wholly divested of the dangerous vicissitudes to which the latter is continually exposed, entirely depending on constitution, and not the matter employed.

SECTION X.

The Abuse of Vaccination.

IT is readily admitted that many persons have had small-pox after vaccination; but, upon investigation, such patients are generally found to be deficient in those signs which denote the former to have been perfected, arising either from some mistake in the period of using the matter, or in the conduct of the operation and subsequent management. The abuse, therefore, to which vaccination is still exposed in this capital cannot be considered as unworthy of notice. The following case, selected from many others, may serve for illustration:—An infant, nine months old, was brought for re-vaccination only a fortnight after it had undergone the operation. The mother, not feeling satisfied, wished it to be repeated. On examining the arms, there were three rose-coloured spots, of an oval form, about the size of a split horse-bean; no elevation of the cuticle had ever taken place, or any surrounding inflammation; the lancet had actually been armed after tearing off the black scab from another child, which readily ac-

counted for the failure. The infant was re-vaccinated from an eighth day case, by five punctures in each arm; on the fourth day nine had taken effect; on the eighth day each vesicle was regularly formed, with incipient indications of the areola; on the twelfth day they had passed the height, and the concentric circles were well defined. From some of these vesicles several children were vaccinated, and the Board of the National Vaccine Establishment supplied with one hundred and twenty-five double-armed ivory points.

SECTION XI.

The important Period of using the Vaccine Lymph.

THE period of taking the lymph for the purpose of vaccination is a subject of infinite importance, and the regulations regarding it cannot be too deeply impressed on the attention of practitioners: indeed the neglect of this circumstance alone has been one of the principal causes of bringing the vaccine disease into disrepute. It cannot be used too early;

as soon as the vesicle, even as early as on the fourth or fifth day, yields sufficient lymph to arm the lancet, it may be done with the surest effect : the usual time, and the latest recommended, is on the eighth day, prior to the full development of the areola. If taken too late it produces an irregular vesicle, destitute of the true characters. Instead of being circular, the edge of the pock elevated, and its centre depressed, the form is reversed, rising in the middle like a cone, or pimple ; by the projection of which the vesicle is more exposed to friction, and likely to be broken, and it always appears as if disturbed by scratching. The lymph, instead of being absorbed into the circulation, thereby affording future protection, is constantly exuding, as from an ill-conditioned ulcer ; the concentric circles are not palpable, the texture is soft and flabby, instead of being compact, and it fails to leave the proper test, viz. a permanent cicatrix. It is unreasonable to expect that such a marked deviation from the regular form and progress of vaccination can offer security against variolous contagion. The period, therefore, of employing the lymph is diametrically opposed to the former practice of inoculation for small-

pox ; the matter in that case was never taken until the pock had turned, as recommended by Baron Dimsdale, under the impression that, the matter having undergone this change, its virulence was modified. An allusion to this circumstance is here made, under the apprehension that some gentlemen in the profession may still labour under a similar idea with regard to the vaccine vesicle. The remarkable case of failure related in the foregoing section seems to have arisen in consequence of such an opinion. To produce the effect of genuine *vaccina*, it becomes indispensably necessary to employ the lymph from a well-formed vesicle, while in its most active state, not exceeding the eighth day. The late Mr. Rush followed this practice, terming it “the golden rule of vaccination.”

Dr. Jenner observes, that “the virus is most active and certain in its effects when taken on the seventh, eighth, and ninth day.” The following arguments, however, may be assigned against the ninth day as a general rule in practice. The inflammation surrounding the edge of the vesicle on that day, in the generality of cases, is quickly advancing towards the circumscribed areola ; and it is strongly conjec-

tured that the efficacy of the lymph contained in the cellular structure of the pustule is thereby proportionably degenerating in efficacy, or becoming more and more imperfect ; and this process is kept up with an accelerating ratio during two or three successive days, until it disappears. On the ninth day, therefore, we ought to consider that the progress of the vesicle has advanced too far to afford a satisfactory lymph for vaccination. Although Jenner recommends the ninth, yet his practice was evidently guided by the state of the areola, for he most judiciously interdicts "the use of the virus after the formation of the efflorescence around the pustule."

It seems, however, that there is no general rule, either in grammar or life, without an exception ; for, even on the eighth day, cases do now and then occur (which will be noticed hereafter), from some constitutional cause, where the vesicle is perfectly correct in all its phenomena, but with the surrounding inflammation at its full height, and even past, as displayed by the concentric circles. For the purpose of propagating vaccination, however, such cases ought invariably to be rejected.

It is confidently hoped that the foregoing remarks will induce the faculty to employ the lymph at an early period, and to refrain from taking it in future when too late; and thus one of the principal sources of error will be avoided, and the vaccine pustule allowed to follow its own innate laws of regular progression. The neglect of this rule is fraught with evil—gives rise to reproachful reflections, as well as alarm. Far be it, however, that these admonitions should be construed into arrogant dictation; they emanate from the result of extensive observation, accompanied by an ardent desire of improving the practice, and thereby sustaining its merits. When inoculation with vaccine matter was first introduced, a want of experience necessarily awaited the practice, and consequently the management was more or less exposed to a greater liability of irregularities, which nothing but time and observation could correct.

In the course of my frequent attendance at the Original Vaccine-Pock Institution, it was often observed that the lymph was used after the vesicle had actually surmounted its height, even down to the fourteenth day, in compliance with the theory held by the late Dr.

Pearson, viz. that so long as the vesicle yielded a transparent lymph, it was capable of producing all the phenomena of the genuine disease. The risk thereby of producing irregular vesicles was greatly favoured. The practical rule, however, of the eighth day is perhaps the only presumptive proof or guard against error. It is not attended by extra trouble, but commands a more absolute regular progression of the vesicle throughout its evolutions; therefore, come what may, the surgeon ever afterwards derives the gratifying consolation of having performed his duty to the utmost of his ability.

To the faculty residing in the country, the practical hint of using the lymph from the fourth or fifth to the eighth day inclusive may frequently be attended with advantage, on the score of accommodation, and also by preserving a larger supply of recent lymph, which is always preferable; but above all, by enabling them much earlier to interpose the antidote, or shield of defence, when the small-pox is raging epidemically. The procrastination of three or four days may thus be avoided, and the patient thereby earlier rescued from

the danger of longer exposure to variolous effluvia.

It is somewhat extraordinary, though a practical fact, that if lymph is used on the eighth day, from an irregular formed vesicle, it nevertheless produces in the person thus vaccinated the regular, well-defined pock, and thereby imparts future protection, although the patient from whom it was taken remains insecure, and requires to be put to the test of re-vaccination. Thus the vaccine virus having been taken at too late a period, and consequently weakened in power, it appears to regain its specific qualities of activity, even under the disguise of an irregular type.

SECTION XII.

Several Vesicles more advantageous than one or two.

A DIFFERENCE of opinion prevails among the faculty with regard to the necessary number of punctures, some preferring one, others two, three, four, and even five, in each arm.

It is readily admitted that one vesicle, if well preserved, or allowed to remain entire, affords sufficient protection. All apprehension, however, of overdoing this mild disease is groundless: but the more freely the vaccine lymph is inserted, the greater perhaps will be the security effected: by affording a larger surface for absorption, the more complete may be the saturation of the system. The unpleasant casualty of one or two being broken or disturbed by accident or design is effectually guarded against by increasing the number of vesicles. The Original Vaccine Institution, from the beginning to its dissolution, uniformly set the example of forming three pustules in each arm, in the figure of an equilateral triangle, each vesicle making a triple apex, distinctly about an inch apart. The last year the number was augmented from three to five, six, or more, in each arm. It is not unlikely that the poor, by undergoing vaccination more freely, are better off than the opulent. The former indeed require greater protection, because they are much more liable to be exposed to the contagion of small-pox. Many of their associates, being yet insensible of the advantages of the preventive process,

carelessly forego “the resource which the charity of parliament most humanely and generously provides for its safety.” This quotation is from the last annual report (1829) of the National Vaccine Establishment; and the following will equally add strength to the argument:—“We have the satisfaction, however, of finding that more than 10,000 of the poor have been vaccinated in London and its neighbourhood since our last report; and it is particularly gratifying to learn, from the records of the last year’s experience of the Small-pox Hospital, that no patient admitted there under small-pox, after vaccination, had been vaccinated by any officer of this establishment: whence it is fair to presume, that when the operation has been performed with due care and intelligence, it is much less liable to be followed by small-pox; and that such care and circumspection are absolutely necessary to a just and confident expectation that complete protection will be afforded by it.” In accordance with the foregoing sentiments, I have always in my public, and generally, if possible, in my private practice, made five punctures in each arm, about three quarters of an inch apart, a distance sufficient to pre-

serve each vesicle distinct: the areola a little exceeds in diameter two pustules, an inch separate.

A practitioner having a number of patients to vaccinate from an eighth day case, a good sprinkling of vesicles allows him to do so with additional confidence, by enabling him to leave two or more untouched. When one or two pustules only are produced, the faculty are frequently requested to vaccinate the family of a relative or friend, and, having no alternative, they are compelled to act contrary to their real wishes or approval.

The example set by Dr. Jenner of forming only a single vesicle is clearly shown in his *Continuation of Facts and Observations*, page 169, 1800. In the description of a case where one of the family was infected with natural small-pox, all the rest, seven in number, had never had the disease. They were all vaccinated; but the operation failed in the mother, who, of course, took the small-pox. In a foot note, he remarks—"Under similar circumstances, I think it would be advisable to insert the matter into each arm, which would be more likely to ensure the success of the operation."

The plan of one vesicle was judiciously de-

parted from by Dr. G. Pearson in public and private practice, in the antecedent year, 1799, and never afterwards adopted. The example of a solitary pustule, thus originally sanctioned by Jenner's powerful mandate, is deeply to be regretted. The opposition offered, however, to this highly important practical point becomes an imperative duty, sanctioned by the observation of experience, and upheld by the trial of time.

The foregoing defence in behalf of more numerous pustules, and the accompanying arguments, may probably suffice to establish the practice of no longer depending upon a solitary pustule.

The highly eminent professional gentlemen who comprise the Board of the National Vaccine Establishment have uniformly enforced the practice of making treble punctures in each arm, and they have also inculcated the absolute necessity of leaving one or two vesicles at least entire. It appears that hitherto, in almost every part of the united empire, either a solitary vesicle, or only one in each arm, is formed. Such a deviation, however, is somewhat surprising, by so widely differing from the example set throughout its course in this metropolis.

SECTION XIII.

An Appeal to Parents.

SHOULD these remarks be honoured by the perusal of the fair sex, whose sympathizing affection, anxious and maternal solicitude, are so invariably exemplified on all occasions for the welfare of their tender offspring—"the mother's hope, the father's joy,"—it is confidently expected that all intelligent mothers will cheerfully become converts to the plans here suggested, and permit the surgeon to exercise his discretional judgment. What can be the cruelty of a few punctures from the lancet to that of leaving the child exposed to the ravages of a loathsome disease?

Lest, however, these observations may excite unnecessary alarm in the minds of the timid or nervous, on retrospection, if only one or two vesicles should have gone through the necessary changes unmolested, they may cheerfully conclude that all is right; but if otherwise, the simple operation of re-vaccination becomes absolutely necessary. When inoculation was first introduced an incision was made in the arm, deep and long enough to

deposit a bit of thread, from a quarter to half an inch in length, stiff, and saturated with the matter of small-pox*.

Burke has observed, that “early and prudent care is the nurse of safety:” let the parent cherish this maxim in his recollection, and in every doubtful case re-vaccinate the subject.

SECTION XIV.

Physiological View of the Mahogany-coloured Crust.

A CURIOUS anomaly with respect to the complete vesicle deserves notice in this place: the black scab, or crust of a well formed pock, after having been kept for months, is sometimes found effective; for which purpose the crust must be reduced to a fine powder in a mortar, and mixed with cold water to the consistence of a mucilage, when vaccination may

* It may, perhaps, not generally be known that the constitution can be equally as well put to the proof by vaccine lymph as by small-pox matter; therefore re-vaccination ought always to have the preference, because life is not endangered.

be performed with the liquid in the usual manner. This paradox future physiologists may perhaps explain; at present it is not easy of solution. It is singular that, after a certain time, as already exemplified, it withholds or ceases to generate the genuine vesicle; but, by undergoing all the regular changes, it would seem that the original property is actually restored to the scab. Why the matter of the vaccine pustule becomes less and less capable of producing the perfect vesicle, after the ninth or tenth day, the following suppositions are submitted for consideration. We may suppose that vaccine lymph, in the first place, produces its own peculiar excitement, in consequence of which a transparent lymph is secreted in a vesicular eruption, impregnated with the vaccine poison; and that this secretion continues till a portion is absorbed, and an alteration thereby effected in the constitution, by which the system is rendered incapable of being acted upon in future, either by the vaccine or variolous poison. After this constitutional change the peculiar vaccine secretion ceases, and an ichorous serum, imperfectly vaccine, continues from the irritation of the fluid collected. The black scab, being

divested of the superfluous ichor, becomes concentrated, and thereby acquires active properties.

The black variolous scab was also formerly frequently employed, and transmitted to distant countries for the purpose of inoculation ; which forms a singular point of coincidence.

SECTION XV.

Inflammation after the Height of the Vesicle.

It affords a gratifying consolation to be able to remark, notwithstanding the free manner of operating generally adopted, that only a single case has occurred of erysipelatous inflammation, extending from the shoulder to the elbow, after the twelfth day, which readily yielded to a saturnine lotion. The arm thus affected had four vesicles, the other three, with the areola of the usual character and dimensions, marked by the concentric circles ; whence an inference was drawn, that the inflammation had been effected either by accidental pressure or external injury. If it had arisen from a constitutional cause, both arms

must have been equally affected, therefore it did not constitute a case of erysipelas, but mere local inflammation. Dr. Jenner mentions three instances of erysipelatous inflammation appearing on the vaccinated arm, which, by the application of mercurial ointment, subsided without giving much trouble.

SECTION XVI.

Description of the regular Vaccine Vesicle.

THE following admirable and uniquely correct description of the progressive laws of development of the vaccine vesicle is extracted from the Report of the National Vaccine Establishment, as ordered by the Board for general circulation to the faculty :

“ When vaccination has been successfully performed, a small red spot is formed on the third day after the operation. If this spot be touched, an elevation is felt ; and if it be examined with a magnifying glass, the little tumour appears surrounded with a very slight efflorescence.

“ The tumour gradually enlarges, and about

the fifth or sixth day a circular vesicle appears. The edge of the vesicle is elevated, but its centre depressed. It is at first of a light pink colour, sometimes of a bluish tint, and changes by degrees to a pearl colour. The centre is sometimes darker than the surrounding parts.

“The vesicle is hard to the touch. In its internal structure it is cellular; the cells are filled with a transparent lymph.

“It commonly increases in size to the tenth or eleventh day.

“On the eighth day, there is formed round the base of the vesicle an inflamed ring, which spreads rapidly, and about the tenth day forms an areola of about an inch and a half diameter.

“This areola has some degree of hardness and tumefaction. The redness continues for a day or two, and then begins to fade, sometimes forming two or three concentric circles.

“The first appearance of the vesicle is seldom earlier, but it is often later than has been described. In a few instances it has not appeared till a fortnight, or even three weeks, after vaccination; but when the subsequent stages have been regular, the vaccination has proved efficacious.”

SECTION XVII.

Cases of secondary Small-Pox more severe than those after Vaccination.

IF an accurate history could have been handed down of all the cases of secondary small-pox, from the time of Charles the First to the present period, it would no doubt appear that such cases were at least as numerous, in proportion to the number of infected persons, as those instances of small-pox which have of late years occurred after vaccination. These adverse cases, however, afford exceptions to a law of the human animal economy. But in such secondary cases of small-pox, it is a singular and well known fact, that the last attack was invariably more severe than the first, and usually fatal. Whereas it may be contended on the clearest evidence, that the disease, when preceded by vaccination, is safe, mild, and usually denominated by practitioners a mitigated case of small-pox, turning on the fifth or six day, resembling rather a slight case of chicken-pox, and scarcely ex-

citing alarm. Few instances of death have supervened; and although in some rarer cases a violent eruption of the confluent type has been observed, yet the protective influence afforded by vaccine has been singularly manifested by preventing the recurrence of the secondary fever: if, therefore, vaccination does not in every case afford absolute security, it nevertheless protects the person from the fatal effects to which he might otherwise be exposed.

SECTION XVIII.

The Age at which Vaccination should be performed, and the requisite domestic Management.

THE best and securest period for the operation is from six weeks to two or three months old, prior to the irritation of teething, when in good health, and free from eruption. Such circumstances are important, because they ensure not only a higher prospect of success, but the child is then incapable of injuring the vesicles by scratching. While

they are forming, the nurse should be careful in dressing, undressing, and washing her charge, to guard against injury by rubbing or breaking them. Should the sleeves of the dress be tight, they ought to be made easy, to avoid friction ; pressure on the vaccine pustules ought to be cautiously avoided. These rules must be strictly regarded from the fourth to the twelfth day. The black scab ought to be allowed to remain until it separates spontaneously, for if torn off prematurely ulceration may be liable to ensue.

When a child is vaccinated at two or three years old, it is yet perhaps incapable of listening to reason, unconscious of danger, weary of restraint, and oftentimes prone to mischief. The adverse consequences arising in such patients have been frequently recognised by their scratching off all the vesicles, during the most active and important period. Such a misfortune, however, by defeating the means of future protection, imperatively demands a repetition of the operation.

SECTION XIX.

*Medical and surgical Treatment, with Remarks
on Climate and Seasons.*

WHEN the patient has passed the height of vaccine inoculation, the generality of anxious parents become solicitous to know what medicine is necessary to be administered. The invariable answer to such inquiry has been, that so far as regards the disease, with its mild and salutary effects upon the constitution, neither a purgative nor an alterative is required, but, on the contrary, that it is much better to allow its influence upon the system to subside gradually : thus altogether differing from the general plan of treatment heretofore adopted in cases of small-pox. The practice of the free use of purgatives, however, in that disease, and more especially after the restoration of the patient, is deservedly condemned by modern practitioners, by its increasing the consequent state of debility, and thereby favouring the production of scrofula. Hence, vaccination possesses the great superiority of

not requiring a single dose of physic, either antecedently or subsequently to the operation.

The public are pretty generally impressed with an idea that the fittest period for vaccinating is in the vernal and autumnal months, thus associating the judicious practical rule formerly recommended by Baron Dimsdale, in conducting variolous inoculation. But such a rule does not apply to the vaccine disease, which may be imparted, regardless of seasons, all the year round with equal efficacy; the summer or winter solstice having no perceptible influence on the pustule, nor even the frigid, temperate, or torrid zones.

The vaccina preserves its characteristic mildness in the East and West Indies, and in the more southern latitudes. It is well understood that the destructive havoc of the variolous contagion was dreadfully increased by heat of climate; the vaccina has, therefore, been gratefully received and eagerly adopted by the inhabitants of hot countries. In the frigid zone it was also equally severe; a whole tribe of Esquimaux, amounting to five hundred, having perished on the Labrador coast.

By the introduction of vaccination, the manifold superiority over its antagonist is

strikingly exemplified among the indigent classes of society, who are all enabled to pursue their usual employments free from every interruption, or even alteration of ordinary diet; whereas, a severe case of small-pox demands unceasing attention, as well as for a certain tedious and indefinite period while the patient is convalescent.

Should any other indisposition supervene during the progress of the vesicle, such as chicken-pox, measles, whooping-cough, scarletina, or teething, they may be treated in the same manner as if the patient was not under vaccination.

Should the rare occurrence of the areola exceeding its usual boundary, and constituting a case of erysipelatous inflammation, present itself, it may be repressed by the frequent application of a linen rag dipped in a saturnine lotion.

If ulceration should chance to follow either the premature or spontaneous separation of the mahogany-coloured crust, which usually occurs about the end of the third week, leaving a cicatrix, a cool bread and water poultice may be applied, or a piece of adhesive plaster. It very rarely happens, however, after the fall-

ing of the crust, that any application is necessary: it has never yet occurred in my practice.

Febrile symptoms sometimes appear about the seventh or eighth day, but they are always slight and transient, accompanied with pain in the armpits, and sometimes headache. In the majority of cases there is no perceptible constitutional ailment. Instances now and then occur where there is no areola; yet if the progress of the vesicle has been otherwise regular and complete, the patient is considered secure from future infection of small-pox.

SECTION XX.

Practical Occurrences and Casualties having Relation to the Operation of Vaccination, including the Manner of inserting the Lymph.

WHENEVER vaccine lymph is taken from vesicles, for the purpose of propagating the disease in public practice, a willing mother with a healthy child is invariably selected, with a good sprinkling of pustules, three, four, or five, in each arm, well defined, in good

order, full of lymph, destitute of the areola, and the ring perhaps but just beginning. The elevated cuticle of three vesicles in the cluster of the same arm is superficially and freely punctured, so as to avoid drawing blood. The vaccine vesicle consists of numerous minute cells imperfectly communicating, as their aggregate contents are unattainable by only one or two punctures. It is curious to observe the long continued oozing of lymph, which far exceeds the original quantity it contained. Such an overplus must arise from an active secretion going on in the cells of the pustule, probably the same as was entering the circulatory system before the cuticle of the vesicle was wounded. This principle of circulation and absorption may also explain the manner in which the constitution is finally protected. The operation is somewhat analogous to glandular secretion, supplying a specific fluid varying in colour, odour, and effect, as destined by the laws of nature, and explainable on the principles of anatomy and physiology.—After this digression, we shall now return to exemplify the uniform purity and application of the lymph escaping from the three wounded vesicles. The triangular apex of one hundred

and twenty-five ivory points, double-armed on both sides (after allowing an interval of time for drying the first course), amounts to the surprising number of five hundred abstracted charges*. By taking the average of patients within the hour of public practice at fifteen, each receiving ten punctures, *i. e.* five in each arm, makes an addition of one hundred and fifty, comprising in all six hundred and fifty charges of vaccine lymph, drawn from the oozing vesicles. The patients, whether operated upon either before, during, or after charging the points, no perceptible difference has ever been recognised, as regards the power or efficacy of the vaccine lymph. These double-armed instruments are invariably dated, numbered, and signed, thereby identifying the source: hence had they ever been found to be defective, either in power or utility, the reflection must necessarily have fallen upon myself; but their efficiency has never been impugned.

It is no less singular than true, that full seventeen hundred patients have been vac-

* This number of armed points has been almost every Monday and Thursday transmitted for the use of the Board of the National Vaccine Establishment.

minated with ten punctures, five in each arm, by one lancet, which is still in use and in excellent condition : the calculation amounts to the astonishing number of seventeen thousand punctures. It is but justice to state, that this admirable instrument was manufactured by Savigny and Company, St. James's Street.

The mode of inserting virus by puncture, instead of the ruder methods, was suggested by Baron Dimsdale : the superiority consists in not carrying the virus too deep. Many instances are recorded, where by conveying it beneath the skin into the cellular membrane, instead of a vesicle, a phlegmonous abscess ensued. The punctures should be made in the hollow that is perceptible in each arm, at the insertion of the tendon of the deltoid muscle. By holding the lancet horizontally and nearly flat, at an obtuse angle with the arm, and thus making the incision, the point of the instrument cannot fail of entering between the two skins, and the puncture will not exceed in lateral depth the scarf-skin : the point ought to penetrate about the sixteenth part of an inch. The lymph is more effectually lodged within the orifice by gently agitating the lancet upwards and downwards within the orifice a few

seconds, and, when withdrawing the point, by making a slight degree of pressure posteriorly on the cutis.

When blood flows too freely from the puncture, it may defeat the operation by washing off the lymph; on which account the most uncertain subjects are those under a week or a fortnight old, when the muscles are flabby, by reason of the cellular membrane not being filled up, and the cuticle so thin in its texture that the lancet, even with the greatest caution, wounds the vessels of the cutis, and the operation is generally required to be repeated. This early vaccination can only be justified under circumstances of small-pox breaking out in the same habitation or immediate neighbourhood. It has been generally remarked, that in almost all cases where blood issues too quickly it is more liable to fail. The variety in the texture of the cuticle of different subjects is very remarkable, and requires attention on the part of the surgeon to adapt the puncture so as to avoid the casualty here alluded to, with consequent failure, which is referrible more to this cause than any other yet discovered. When the skin is thus delicate, success is

better effected by arming the lancet every touch, holding the instrument in a slanting direction downwards, slightly pricking the skin, and wiping the lymph into the orifice. Another mode is by making as superficial a puncture as possible, in the usual manner, and applying more lymph, after it has ceased to bleed, with the flat surface of the lancet.

It is surmised, and practically proved, that lymph, when employed upon an ivory point, is preferable to glass, by the former conveying the undiluted virus with greater mechanical accuracy into the previously punctured orifice; and by its remaining some seconds accompanied with gentle agitation, thereby allowing the serum time to dissolve and assimilate with the exsiccated lymph, it rarely fails of effect. A single point is mostly equal to vaccinate two punctures, by reversing the side in the second application; hence three points may suffice to produce six vesicles, three in each arm. But another, perhaps more eligible, mode is, to let the apex of the ivory instrument stick in the orifice (which, from its lightness, is able to poise its own weight), while the other is undergoing similar treatment:

the latter is also preferable to the former by reason of causing less pain.

It is feared that vaccination is not always performed with that delicacy of manipulation which it requires for its success. For many obvious reasons, the practice or mode of vaccination is excluded from our public hospitals, and the administration is necessarily exposed to the chance of caprice and irregularity. With a view, therefore, of endeavouring to establish a more uniform system in its management, the author is induced by a zealous desire of promoting, by every possible means, the general success of this important branch of the subject, to offer instruction to the student who is about quitting his studies and commencing practice. Twice or thrice witnessing and receiving a verbal explanation of the operation would suffice. This scheme, it is said, has been recently adopted by a physician who is well known as being connected with a public institution for vaccination.

When a vesicle is damaged during the most active period of secretion, from the fourth to the eighth day, it becomes materially deficient in the quantity of lymph, and deceives

the observer by insidiously undergoing the relative vicissitudes of areola, concentric circles, to the black crust, and even cicatrix. By such a reduction of lymph, the chances are, that an adequate degree of absorption, necessary to protect the constitution, is either greatly diminished or wholly defeated; and if only a single pustule is thus detected, a failure ought to be anticipated, and re-vaccination strongly recommended. This fact has been frequently recognized while puncturing the vesicles for drawing lymph to double-arm the points, out of a group of vesicles in the same arm: the one that has been injured, although corresponding in size with the rest, but a shade darker, by repeatedly puncturing the cellular structure, so completely refuses to yield a discharge of lymph, that a single point or glass cannot even be moistened. A plurality of vesicles is, therefore, the only provisional alternative of guarding against such a treacherous enemy.

SECTION XXI.

A most remarkable, and probably unique, Case of Vaccination, accompanied by the Phenomenon of true vaccine Eruption.

DURING the early period of the introduction of vaccine inoculation some mistakes were inadvertently made, which caused many others to blunder, owing to Dr. Woodville's employing the lymph in the Small-pox Hospital; by which means it became contaminated by the variolous miasmata with which the wards and furniture abounded, and, thus polluted, gave rise to a disease totally different from genuine vaccina, and the seeds of a spurious distemper were widely disseminated. The *variola vaccinae* is justly esteemed to be non-eruptive, as well as non-contagious. Dr. Woodville published his cases, which comprise an average of three-fifths, at least, with variolous pustules. These cases gave rise to an interesting controversy between Dr. Jenner, and others, with Dr. Woodville, who at length yielded to conviction, and honourably recanted his error. These cases, however, until fully explained,

excited alarm, and, for a time, contributed to retard public confidence in the simplicity of the new disease.

In August, 1829, a healthy sucking babe, six months old, was vaccinated, in fellowship with twelve other infants, from the vesicles of an eighth day case; the latter number went through the relative degrees of vaccination in the usual style. On the eighth day several of these were confronted with the phenomena of this unusual case. The mother stated that her child had an eruption, which came out the day before (seventh), and wished it to be examined. The patient had, from the effect of the operation, four vesicles on the right arm and three on the left, correct as to form and size, with a pearly hue, but the areola forwarder than is usual on the eighth day, exceeding an inch in diameter. The eruption appeared on the face, extending over the body, but thinly scattered, amounting to about fifty, mostly two or three inches asunder. Each eruptive pock bore a beautiful miniature resemblance, about half the size, of those on the arms effected by the operation; the diameter of each eruptive vesicle exceeded the eighth

of an inch, circular, indented in the centre, and elevated edge, the surface of a polished pearly lustre, and surrounded by a rose-coloured areola, half an inch in diameter.

This eruption may be deemed to be *sui generis*, differing from all others, and by no means partaking of the varioliform type. The case is so extremely rare that no one, it is surmised, has met with its fellow: it yields an exception to a general rule, a departure from the usual law of the disease and the animal economy, in nosology, from its rarity, incapable of classification, and it can only be viewed as a capricious play of nature.

It is deeply lamented that the ungrateful mother refused to comply with further attendance, and, by a false address, no tidings could be learnt of the final result. It is fair to infer, however, that the case terminated favourably; and, by the eruption keeping pace with the vaccinated pustules, that they devolved into black scabs, and probably left individually a corresponding cicatrix.

SECTION XXII.

Proportion of Cases discovered to have been unprotected on the Repetition of the Process of Vaccination.

THE small proportional number to be described affords a pleasing result, which may probably inspire more implicit confidence in the public mind, on the practice as well as durability of vaccination. Before entering upon the detail of the cases, it is singular to remark, that they were incidental only to my private, and not to my public, patients, although the trials upon the latter have more than quintupled the former. Five cases have thus occurred, in all of which regular vesicles were the result; as they passed through all the gradations, and terminated in the mahogany-coloured crust, and leaving the scar. Four were under nine years of age, and had been vaccinated in the country; the fifth is a young lady about two or three and twenty, who was re-vaccinated, with two sisters about the age of nineteen and seventeen: the two latter resisted the operation in the usual man-

ner, but the eldest went through the changes regularly. On inquiry in this and the above cases, the progress of the former vesicles, single in three instances, one in each arm of the others had been deficient, the cicatrix in all being scarcely discernible; the patients were therefore in all probability insecure, until after the second operation.

As truth and candour are throughout my object, it may be here stated, that a slight deviation from a primary case was perceptible in each; the vesicles were less firm in their texture, dull, opaque, and of a dingy yellow; the areola somewhat diminished in extent and depth of colour, and the concentric circles were scarcely definable. This difference was attributed to the effect of the original vaccination faintly retaining its influence upon the constitution; and if this principle be admitted, it may cast a gleam of light, and enable us to account for the general mitigation of small-pox, and the non-appearance of the secondary fever, even after irregular vaccination.

SECTION XXIII.

Anomalous Cases, wherein the Constitution resisted frequent Vaccination, and also Two synonymously of Small-Pox Inoculation.

CHARLOTTE GORDON, residing at 44, Brewer-street, had been vaccinated when a month old, and twice afterwards, but unsuccessfully, at the original Vaccine-Pock Institution. The child was brought to me at seven weeks old, and was submitted to seven more repetitions of the operation from time to time, until it arrived at the age of fifteen months. These trials were repeated at the earnest desire of the mother, who entertained a considerable degree of horror at her infant's taking the natural small-pox. The patient throughout was in excellent health, and although latterly teething, remained exempt from bodily suffering.

A young lady in her eleventh year, the only child of Baron N——, was recommended to be re-vaccinated the fourth time by Dr. James. The patient had never been absent from the tender care of her parents, who assured me

that their daughter had neither taken the small-pox, nor had ever undergone an eruptive disease, except the measles. Five punctures were formed in each arm, which all took a premature effect, but disappeared on the sixth day. The Baron remarked on the fifth, that the operation had gone further than any of the three preceding, each vesicle being larger and more inflamed. The patient has enjoyed excellent health throughout life, which was exemplified by a good complexion, and well grown, symmetrical stature.

The first case, therefore, resisted the force of vaccine virus ten times, and the second four. Five punctures were invariably made in each of their arms, nearly all of which took a transitory effect, by going on prematurely and irregularly up to the fifth day, and disappearing on the sixth or seventh. Each pustule resembled a loose constructed pimple, attended by constant itching, a small, imperfect, premature areola; thereby strictly resembling those cases which have been tested after regular vaccination, or small-pox inoculation.

Two other instances precisely according

with the above have since occurred. A child eight years old, re-vaccinated four times ; and a boy of three years, three operations ; and both were remarkably healthy.

These cases become interesting, on account of their singularity and comparative rarity of occurrence, and are therefore deemed worthy of communication ; and have elicited the following reflections. Such anomalous variation from the natural course of the disease deeply concerns the patient, and even the faculty, who perchance may meet with parallel instances. The relative situation is distressing ; for until the vesicle can be brought to maturity, perfect exemption from variolous contagion cannot be guaranteed, although a speculative inference may be drawn, viz. that so long as the body is incapable of vaccine virus it will also remain unsusceptible of small-pox. With a view, therefore, of discovering the definitive constitutional change, either a six months' or annual re-vaccination ought to be adopted. In the possible event, however, of direct exposure to variolous effluvia, immediate recourse ought to be had to the operation. The final termination of the cases of

small-pox, about to be described, will not justify the idea of their always remaining invulnerable.

The following parallel case of small-pox inoculation came under my observation in my early youth. A valet of the late Colonel Schutz, a healthy man in the prime of life, underwent six inoculations in the course of three years: each operation was freely performed in both arms during the vernal and autumnal seasons, all of which were alike ineffectual. The seventh inoculation, however, succeeded to its fullest and most alarming extent, by producing the confluent type, which had nearly proved fatal.

The brother of Dr. E. Bancroft was inoculated for the small-pox eleven times, and once taken to a patient labouring under the disease, and inoculated in both arms with a large quantity of recent matter; yet he afterwards caught the small-pox in the natural way.

By what extraordinary power the human system is rendered capable of resisting, for a series of years, either variolous or vaccine virus, and ultimately dispensing with the armour of defence, and no longer remaining in-

vulnerable to its action, offers a problem worthy of solution.

SECTION XXIV.

The Occurrence of Small-Pox after three Vaccinations.

THIS case happily tends to confirm the argument held in the preceding section.

A young gentleman, a student at the Charter-House, after having been vaccinated at three distinct periods, caught the natural small-pox when in his fourteenth year. The case was extremely mild: the pustules extended over the body, amounting to about a hundred, including twenty or more on the face, where they made their first appearance: the type was distinct, which turned on the night of the sixth day or morning of the seventh in the usual manner; first on the face, and progressively downwards. Two professional gentlemen, residing in the adjoining house called the hospital, saw the patient re-

peatedly : at first they pronounced the eruption to be chicken-pox, but afterwards, together with myself, were convinced that it was infallibly small-pox. It was impossible to derive from the patient, and in the absence of the parents, any satisfactory account of the first, second, or third vaccination. The cicatrix, however, was insufficient, and by no means regular or fully apparent. It is therefore conjectured that the three operations altogether failed, for otherwise he surely would have been protected ; some peculiarity of temperament probably existed, and it is not unlikely that such an untoward cause led to the repetition of vaccination, and that neither parents nor surgeon were fully satisfied of the result of any one of them. Some interesting cases, wherein it has been found hitherto to be impossible to produce the regular characteristics of vaccina, are described in the foregoing section ; and it is highly probable that this case partook of their singularities for a series of years.

SECTION XXV.

A Case of Small-Pox eleven Years subsequent to Vaccination.

ABOUT three years ago, a fine youth, twelve years old, was suddenly attacked with small-pox: the symptomatic fever was rather severe, but quickly relieved by a slight sprinkling of pustular eruption, which turned on the sixth day, thereby constituting a favourable case, such indeed as is generally observed after irregular vaccination, by strikingly exemplifying the beneficial influence of the prior operation. The patient, and all his brothers and sisters, had been vaccinated in their early infancy: he had had one vesicle in each arm; a mere indistinct vestige of the cicatrix was perceptible. During the period of the youth's confinement he was unremittingly associated with his three sisters and two brothers. As soon as the symptoms unfolded their character, a proposal was made of re-vaccinating the brothers and sisters; the parents, however, preferred the alternative of their children taking their chance of infection, which

they all escaped. The eldest sisters were twenty and nineteen, the youngest two years, the elder brother seventeen, and the other eight years old. Although the patient was insecure, yet, however, the rest of the family gave convincing proofs of the durability of vaccine protection. It may be fair to infer, from the indistinctness of the scars, that some casual cause had intervened during the active progression of the vesicles, which evaded detection.

SECTION XXVI.

Protracted Cases, exceeding the twelfth Day.

MANY cases have occurred in the course of practice wherein the vesicles have far exceeded the usual period of the eleventh or twelfth day in arriving at their height. A few of the most remarkable have been selected by way of exemplification.

An infant, six weeks old, dependant on the breast of its mother, who were both in good health, was vaccinated, with several others, from a well formed eighth day pustule: on

viewing the punctures on the fifth day they were scarcely visible, so much so, that out of five originally made, the number that had taken could not be defined; on the eighth day four vesicles in each arm were evident, but unusually backward in size, corresponding with the usual appearance of the third or fourth; on the sixteenth they resembled the seventh: they did not arrive at their height until the twenty-first day. The pustules were then of an average size, circular, indented in the centre, and the edges properly elevated; the areola was not so extensive as usual, but rather defective, and the concentric circles were indefinable. The black crust was afterwards properly completed, but did not separate from the arms until the thirtieth day. Their eight corresponding bases were marked by a proper cicatrix.

Another case, with nearly all the above described casualties, happened in a very fine girl, with rosy health depicted on her cheeks, two years and nine months old. The progressive order of the vesicles was so similar to the foregoing, that it would be superfluous to recapitulate it. The deviation consisted in the period of height, which took place on the

twenty-fourth day; the areola was perfect which left the concentric circles; the mahogany-coloured crusts fell off on the thirty-third day, each leaving a scar. There were three vesicles in each arm.

A still more remarkable case did not arrive to the height until the thirtieth day, and the black scabs remained until the fortieth, and two even longer. The patient was healthy, and two months old.

In the early time of vaccination, when all the faculty were eagerly employed in the pursuit of information concerning the new inoculation, the late Sir Richard Croft, Bart., directed my attention to a case of this description. A young lady, fifteen months old, had been vaccinated by Sir Richard, who informed me that he had inserted the lymph sixteen days before, and the vesicles appeared at that time just as they usually do on the eighth. I saw the patient the same day, who had one vesicle in each arm, which was well defined, resembling the appearance of the eighth; indented, of a pearly hue, and properly elevated, but as yet no appearance even of the ring or areola. The patient was in high health and spirits, and was romping merrily when I en-

tered the nursery. Sir Richard Croft afterwards said, that it did not arrive at the height until the twenty-second day. On putting the question, whether, under such circumstances, he meant to re-vaccinate, he answered in the negative, and expressed perfect satisfaction at the result.

Several other cases have occurred wherein the height has been variously delayed beyond the usual time. The subjects have mostly been in excellent health, but some few delays have arisen by the intervention of infantile diseases, such as teething, or contagion caught a few days subsequently, or previously, to the operation, more especially the measles.

Such deviations from the general law of progression of the vaccine vesicle can only be attributed (when free from other maladies) to some inherent peculiarity of constitution, which is difficult to be explained. It cannot be chargeable to the quality of the vaccine lymph, because many contemporary cases, which observed the natural course, were vaccinated from the same vesicle. These cases serve to remind us of the various periods of turning in small-pox. Every reliance, however, has been placed on the future protective

influence of these protracted cases ; so much so, that re-vaccination has not even been suggested. The following reasons may be assigned : First, although their progress has been tardy, yet they have ultimately arrived at that state of perfection as to authorise the expectation of ulterior protection : secondly, the longer time the vesicles were approaching maturity, the absorbent system constantly operating, the constitutional impregnation would be equally perfected. The sluggish vesicle resembles a flower planted in an uncongenial soil and aspect, which cause a slower development of its beauty and the true characters of its genus ; but, nevertheless, it finally produces its fruit, and is not rejected by the botanist. All such cases, however, are beyond the reach of control ; but, notwithstanding, they demand much greater confidence than those which have been abused by neglect, in using the lymph when too late ; or where the vesicles have been torn off by accident, and thereby checked in their gradual evolution.

It may be here remarked, that similar cases have been met with under variolous inoculation. Dr. Odier of Geneva mentions that

“the longest time he had known before redness and tumour, denoting signs of inflammation, have appeared in the arm after inoculation of small-pox was seventeen days. Cases have also occurred where these symptoms have not appeared till twenty-nine or thirty days after the operation, and, notwithstanding this delay, the individuals have enjoyed security.”

SECTION XXVII.

Premature Cases under Vaccination.

IN the annals of physiology few subjects can excite a higher concern than a faithful record of this curious disease, with its effects, advantages, and progress. The vicissitudes to which it is subject, although somewhat perplexing, and defying all human power of correction, yet demands our serious attention, and becomes additionally interesting as a matter of philosophical research.

Premature cases occasionally happen, so similar in result that it would be superfluous to particularise them. The opportunity of

witnessing them rarely occurs until the eighth day, because on the fourth, or fifth, or even later, the evidence of too rapid a movement in the pustule is not always distinguishable. The vesicle on the eighth day preserves its size and character, but the surrounding inflammation appears at its height, and the edge of the pustule is nearly on a level with the surrounding areola, which, to an experienced eye, imparts the impression of its being sunk or depressed. About seven cases of this character have been observed.

Two rarer instances of this sort had actually surpassed the height on the eighth day, which was betokened by the complete formation of the concentric circles. The same observations made in the preceding description of tardy cases, equally apply to the vaccine lymph employed ; these likewise forming exceptions to the contemporary patients.

It is surmised that such premature action is less capable of guarding the constitution against variolous contagion than those which are unusually slow in arriving at maturity, and, therefore, re-vaccination, after some months, had better be tried.

For the purpose of vaccination, however, all such cases ought invariably to be avoided. They are dangerous impediments in the way of practice, and the faculty should reject them ; and, like the skilful pilot who steers the helm clear of rocks, shoals, and shallows, lest immediate danger should accrue to the valuable cargo, by avoiding extremes, and steering mid-channel, conducts the vessel into the harbour of safety.

SECTION XXVIII.

Chicken-Pox mistaken for Small-Pox after Vaccination.

MARGARET BAILLEY, a healthy infant, vaccinated at six months old, had seven vesicles, which passed satisfactorily through the usual course. Five months afterwards, an eruption appearing, the mother applied to a chemist, who said it was small-pox, and, thus alarmed, she came to me. Mr. Stone being present, we minutely examined the child, and decidedly pronounced the disease to be chicken-pox. Being the fourth day, the eruption was ge-

nerally subsiding; it began on the shoulders and back, extending over the body and face; the patient lively, free from fever; the vesicle preceded and accompanied by a much larger inflammatory base than is usual in small-pox.

It is well known that the symptoms of chicken-pox sometimes bear a close analogy to those of small-pox, that even matter has been employed for inoculation, but of course afforded no security to the patient from variolous contagion. The first appearance of small-pox eruption is uniformly on the face, whereas that of chicken-pox begins in other parts of the body. The progress of the respective eruptions also differ materially. The beginning of variola resembles a flea-bite, gradually enlarging and forming the pock, turning on the tenth day, and later; whereas the pustule of the chicken-pox is designated by a much larger inflammatory base, rapidly developing its pellucid vesicle, going off suddenly on the fourth or fifth day.

SECTION XXIX.

Practical Remarks on the Cicatrix or Vaccine Scar.

THE scar that arises corresponds in circular form and size with the mahogany-coloured crust, from the separation of which it takes its origin, and it ought to remain permanent through life; it has also a boundary line or edge, and a number of minute indentations may be frequently observed in the skin, indicating the cellular structure of the original vesicle. Such a regular formed cicatrix has hitherto been generally admitted as affording the strongest presumptive proof of successful vaccination; for in most adverse cases where small-pox has followed, or the patient has been found unprotected, the absence of a well defined scar has been remarked by various authors, and alluded to in former sections.

This subject embraces many very important practical points: even after a well formed vesicle the scar is occasionally subject to deviations from the regular standard, and the indentations are not always perceptible. In some doubtful cases, however, the faint re-

mains of a cicatrix is only discoverable by minute inspection: a smooth spot, about a quarter of an inch in diameter, and sometimes less, lighter in colour than the surrounding skin, and the exact boundary indefinable. In all cases wherein the scar is thus defective, the only alternative is to repeat vaccination; but it will be made to appear that it is under all circumstances but a doubtful test. Its varied appearance has recently been particularly noticed, while re-vaccinating several patients in public practice at the age of puberty, wherein notwithstanding many remarkable variations were observable in the cicatrix, they nevertheless have been proved to be perfectly secure.

A case with two irregular scars, conforming with the foregoing description, is now under re-vaccination. A fine healthy boy, five years old, was vaccinated in infancy at eleven months: one puncture had been made in each arm, by a gentleman not of the medical profession. The mother informed me that the disease did not go through the progress properly at that time. The child has now six full-sized vesicles on the right arm, and five on the left.

This case further corroborates the argu-

ments already applied to the causes of failure in vaccination. If the patient had been exposed to variolous contagion he could not have escaped its consequences, and under such circumstances it would necessarily have been reported as small-pox after vaccination.

The mother also of this child was vaccinated in infancy : each arm bore a proper scar. She requested to be re-vaccinated, and was found to be fully protected in her twenty-eighth year.

Another representation of an interesting case worthy of record has just occurred, wherein the cicatrix was very defective, but, notwithstanding, the patient was found, by the repetition of vaccination, to have been effectually protected against variolous miasmata ; which decision was amply confirmed by five punctures made in each arm, all of which took effect, but went on prematurely, accompanied by constant itching, too precipitate and inefficient inflammation, and loosely constructed pimples, which healed and disappeared on the seventh day. It may be remarked, that during the progress of a solitary vesicle in the original vaccination, a peculiar circumstance occurred, which justly excited mistrustful apprehensions

in the mind of the patient, who was accordingly induced to undergo re-vaccination. The patient is a married lady in her nineteenth year, and highly intelligent. After minutely inquiring into the cause of doubtful safety, it appeared that the vaccine vesicle had passed through all the changes properly, and terminated in the mahogany-coloured crust, but throughout its progression it was totally devoid of surrounding inflammation. 'This instance thereby happily tends to confirm some former observations in this work, viz. that where the vesicle is correct, even without areola, the patient may nevertheless be pronounced equally protected.

This young lady was primarily vaccinated only eight years ago, which accounts for her clear traditional history and recollection of the result. In consequence of small-pox breaking out among the domestics of her family she felt alarmed, and immediately came to town to undergo the test of a second operation. She has since returned to her family in the country, fully convinced of her state of security, although they are still afflicted with variola.

Previously to re-vaccination, while examin-

ing the faint and truly irregularly constructed scar, insecurity is acknowledged to have been fully surmised. The unexpected and favourable termination, however, afforded sensations of surprise and gratification, by practically demonstrating that even an ill-formed scar, after all that has been said and written upon it, probably affords but a doubtful proof of insecurity, although it cannot be relied upon infallibly.

Since writing the foregoing remarks another extraordinary case has been met with. A gentleman in his twenty-second year had been vaccinated in infancy ; upon being re-vaccinated, the ten vesicles which took effect, by the perfect regularity of their progress, gave striking proofs of previous insecurity, although he had a solitary well-defined scar, such as is described at the commencement of this section. The elder brother, in his twenty-fifth year, was also re-vaccinated, and was found, by the rapid progress of the vesicles, five in each arm, to have been fully protected, although the scar was very imperfect : he had been vaccinated when a child.

This momentous link of the practice of vaccination demands our serious attention. In

future it ought to be more assiduously scrutinized, with the hope of discovering additional light upon a subject which at present seems to be involved in some degree of perplexity, and is rather equivocal. These practical inferences are drawn from the preceding and other cases alluded to in this section: their novel importance may perhaps excite due consideration, by placing such cases more frequently under practical observation by the operation of testing. Indeed there seems to be no other alternative of ascertaining the patient's security, but more especially in those instances where a single vesicle had been originally adopted.

SECTION XXX.

*Extinction of Small-Pox in Foreign Countries,
compared with its State in Great Britain.*

IF the Jennerian practice could be effectually and universally enforced, small-pox must altogether cease. The freedom, however, enjoyed by the people of the British empire precludes the government from passing a

bill to enforce vaccination. A proposal to legislate in this particular case was made, in the year 1813, by Lord Borringdon, for that express purpose, but rejected. The following extract from a popular periodical work* proves the successful results of enforcing the anti-variolous influence in foreign countries.

“About twenty years ago, when it was proposed to purify the medical profession from quackery and ignorance by legislative enactments, the late Dr. Gregory of Edinburgh published a letter on the subject, in which he remarked, that ‘England is a free country, and the freedom which every free-born Englishman chiefly values is the freedom of doing what is foolish and wrong, and going to the devil his own way.’ This is strikingly exemplified in the present state of vaccination in Great Britain, compared with its state in other countries in Europe. In the latter, general vaccination was ordered by government: no one who had neither vaccine nor small-pox could be confirmed, put to school, apprenticed, or married. Small-pox inoculation was prohibited: if it appeared in any house, that

* Quarterly Review, No. 66, 1825.

house was put under quarantine; and in one territory, no person with small-pox was allowed to enter it. By such means the mortality from this disease, in 1818, had been prodigiously lessened. In Copenhagen it had been reduced from 5500 during twelve years, to 158 during sixteen years. In Prussia it had been reduced from 40,000 annually to 3000: and in Berlin, in 1819, only twenty-five persons died of this disease. In Bavaria, only five persons died of small-pox in eleven years: and in the principality of Anspach it was completely exterminated. In England, on the other hand,—in England, the native country of this splendid and invaluable discovery, where every man acts on those subjects as he likes—crowds of the poor go unvaccinated: they are permitted not only to imbibe the small-pox themselves, but to go abroad and scatter the venom on those whom they meet. A few years ago it broke out in Norwich, and carried off more persons in one year than had ever been destroyed in that city by any one disease, except the plague. A similar epidemic raged in Edinburgh; and last year it destroyed within one of 1300 persons in the London bills of mortality.”

This document may be received as an epitome of general results, fully authenticated and confirmed in all parts of the world. Foreign climes have now more to fear from us than we from them: for it is in this enlightened nation alone, which gave birth to Jenner, that small-pox is cherished, and the existence of a loathsome disease, which is daily devouring its victims, and has ever been considered as the severest scourge to the human race, is shamefully and ungratefully nurtured. The unwillingness of the lower classes to receive the boon so readily conceded to them of gratuitous vaccination is deeply to be deplored. The full prophylactic property of this invaluable blessing is opposed by obstinacy, bigotry, and prejudice. The mild form of vaccina presents an antidote by which neither suffering, mutilation, blindness, nor death can supervene: it figuratively portrays the triumph of Innocence over Vice, or the ferociousness of the tiger subdued by the gentleness of the lamb!

SECTION XXXI.

Conclusion.

THE importance of the vaccine disease has been so repeatedly and elegantly eulogized, that it would be superfluous to join in the echo of laudatory strains of numerous authors. Its perfect innocence upon the human constitution has been supported also by general acclamation; and this point has been attempted to be variously inculcated throughout this summary of the disease by practical documents. Some theories, however, among authors of the highest celebrity, have been fearlessly canvassed whenever the co-operating aid of experience has demanded their refutation. The general character and primary intention of this work has been to endeavour to strike out a more consistent and systematic mode of treatment; which hitherto appears, it is unequivocally admitted, upon the highest authorities, to have been lamentably subjected to many irregularities and omissions, thus greatly and unjustly contributing towards tarnishing its genuine characteristic qualities. The lapse of time, how-

ever, has led to the detection of defects which in its primitive state could not be anticipated. It may be rightly said that thousands who have now arrived at the adult age and by many years exceeded it, were vaccinated in their early infancy by a *solitary* vesicle, which was perhaps wounded and disturbed during its most important crisis for the purpose of conveying its virus to others ; or by lymph taken at an improper period, and even before the developement of the vaccine disease and the contents of its vesicle were either properly comprehended or appreciated. The impression of early prejudice has been lengthened even down to the present enlightened era, and original precepts are still pursued in almost every part of his majesty's empire : how deeply, therefore, is it to be regretted that the exemplary rule of forming triplet vesicles at least should not be universally observed ; indeed the indigent in this metropolis may be said to be, consequently, better protected perhaps than the generality of their countrymen, which has been numerously exemplified by re-vaccinating the mother from her own offspring.

The timid forbearance of early authors was

founded, it is surmised, upon two distinct heads ; first, the apprehension of exciting too much constitutional irritation, lest the vaccinated patient should be exposed to sufferings similar to the milkmaid when directly imbibing the disease from the teats of the animal ; and that phagedenic ulceration, as in the cow and the milker, might possibly ensue. Secondly, the prevailing custom of the then general mode of variolous inoculation ; viz., a solitary vesicle, which, in all probability, gave rise to this *fatal example* ; whereas it is fully shown in this treatise that vaccina cannot be overdone by a plurality of vesicles, and no feasible objection can be offered to this rule. Neither immediate nor future cause of apprehension need be anticipated, provided that the vesicle displays its original size, force, duration, colours, form, and extent of areola ; and thus the human constitution shows the power of sustaining the vaccine lymph's original purity.

The practice of re-vaccination in all doubtful cases has been recommended throughout this summary, but it may with singular truth be said to apply exclusively to Great Britain. The quotation from the Quarterly Review, in

a former section, sets forth unequivocally the extraordinary promptitude and success with which foreign countries have enforced universal vaccination. This important subject occupied, in 1827, the deliberate attention of a committee of the *Académie Royale de Médecine* of Paris, and their report agrees with many arguments adduced in these pages; it may therefore be interesting to insert a succinct account, in order to exemplify the opinion formed by the French of the advantages of vaccination.

The committee reported, at the annual meeting of the members of that institution, that small-pox did occasionally occur after vaccination, but not to the extent imagined; and that no case of small-pox, after vaccination, terminating fatally had come to their knowledge. The public exhibition of the idea, of a limited duration of vaccine influence, was considered by the committee as fraught with the greatest danger, inasmuch as the peace of families would be unnecessarily disturbed, the minds of those who attend to the subject confused, and the extension of vaccination partially impeded, from an unsettled belief in its efficacious effect. The question

was thoroughly investigated; and after making the utmost concessions, and admitting all the cases of small-pox, after vaccination, to be authentic, re-vaccination was judged to be unnecessary. The committee say, it would only be requisite to compare those rare cases of small-pox, after vaccination, with the innumerable cases of the disease in those who have not been vaccinated, and also with the immense number of those, who having undergone the process, have been exposed to the contagion with impunity, in order to be convinced that vaccine inoculation is one of the most useful discoveries that has ever been made, and that this invaluable antidote still preserves its virtues.

Should these humble efforts hereafter assist in elucidating a subject which concerns the health and welfare of all mankind, the most lively sensations of gratification will be derived.

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was thoroughly investigated; and after making the utmost comparisons and admissions in the cases of small-pox, after vaccination, to be more healthy, re-vaccination was judged to be unnecessary. The committee says it would only be requisite to compare those late cases of small-pox after vaccination with the immense number of those who having undergone the process have been exposed to the contagion with a view to the same.

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